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USSR Report

ENERGY

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8 August 1984

USSR REPORT

ENERGY

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OIL AND GAS

MAL'TSEV OUTLINES ACHIEVEMENTS, TASKS OF PETROLEUM INDUSTRY

Moscow NEFTYANIK in Russian No 3, Mar 84 pp 2-4

[Report on speech of USSR Minister of the Petroleum Industry N. A. Ma'tsev at an expanded meeting of the Collegium of the USSR Ministry of the Petroleum Industry and the Presidium of the Central Committee of the Petroleum and Gas Industry Workers Union on 28 January 1984: "Toward New Achievements in the Development of the Petroleum Industry"]

[Text] An expanded meeting of the Collegium of the Ministry of the Petroleum Industry and the Presidium of the Central Committee of the Petroleum and Gas Industry Workers Union was held on 28 January 1984. Responsible officials of the CPSU Central Committee, the USSR Council of Ministers, the USSR State Planning Committee, the USSR Committee of People's Control, related ministries and departments, republic and oblast trade union organizations and executives of associations, administrations of main pipelines, geophysical and construction trusts and scientific research and planning institutes attended the meeting.

Minister of the Petroleum Industry N. A. Mal'tsev delivered the report "On the Results of the Work of the Sector During 1983 and the Tasks of the Collectives of Enterprises of the Sector for 1984 in Light of the Decisions of the December (1983) CPSU Central Committee Plenum."

The speaker noted that the organizing work of the party on the tightening up of state and labor discipline in light of the tasks, which were posed by the November (1982) and June (1983) CPSU Central Committee Plenums, had yielded appreciable results: the rate of development of production and labor productivity had increased, the discipline of deliveries had been tightened up. The responsibility of personnel had increased. Our country has advanced noticeably in all directions of economic and social construction.

The decisions of the December (1983) CPSU Central Committee Plenum gave a new mighty stimulus to the creative activeness of the masses, having aimed the party and all the Soviet people at the achievement of new gains in the building of communism.

The petroleum industry workers, as all the Soviet people, fully endorsing and fervently supporting the foreign and domestic policy of the party, have assumed increased counterplans and socialist obligations. The initiative of the leading collectives of the country, which was supported at the December (1983) CPSU Central Committee Plenum, on the exceeding of the set assignments on labor productivity by 1 percent and the decrease of the product cost by 0.5 percent has been taken up by all the workers of the petroleum industry.

During the third year of the 11th Five-Year Plan the further increase of petroleum production was achieved in the sector. The level of production of petroleum along with gas condensate in the country came to 616 million tons. The greatest increase of petroleum production was obtained for Western Siberia. The development of the main petroleum-producing base of the country is a national matter. The potential of other regions of the country, including the majority of petroleum-producing regions, has been attracted here.

The meterage of producing and exploratory wells, which last year came to 26 million m, increased rapidly. Drilling operations were developed especially rapidly in Western Siberia, the Komi ASSR and Western Kazakhstan.

The industrial potential of the sector increased significantly: in 3 years of the five-year plan fixed capital worth more than 21 billion rubles, 27,000 oil wells and capacities for the processing of 3 billion m³ of petroleum gas were put into operation.

The collectives of the Yuganskneftegaz, Tatneft', Bashneft', Mangyshlakneft', Kuybyshevneft', Turkmenneft' and Grozneft' associations achieved good results.

The main thing in the success of the associations and enterprises is the smooth, highly productive, purposeful work of the collectives of brigades. The collective of Surgut Petroleum- and Gas-Producing Administration No 2 achieved outstanding results. In 1983 more than 600,000 m, or on the average more than 100,000 m per brigade, were drilled here. The painstaking, consistent organizing work of the managers on the concentration of the efforts of all the collectives, which are taking part in the construction of wells, for the accomplishment of the posed tasks is at the basis of this success.

The fact that precisely here the Komsomol-youth brigade of foreman V. L. Sidoreyko drilled in 1983 117,000 m of wells, which is a truly outstanding achievement, is also not by chance.

The collectives of brigades for the production of petroleum and gas, which are headed by foreman P. A. Pret'yakov from the Mamontovneft' Petroleum- and Gas-Producing Administration, foreman A. G. Iskhakov from the Leninogorskneft' Petroleum- and Gas-Producing Administration, foreman F. K. Khusainov from the Yuzharlanneft' Petroleum- and Gas-Producing Administration, and many others are showing models of labor. There are many leading collectives and shock workers of production in the servicing and overhaul of wells, rigging-up operations and petroleum pipeline transportation and at gas processing and machinery and repair plants.

At the same time, while noting the successes in the development of the sector, it is necessary to focus the main attention on the shortcomings, which are still occurring in the work, and on the means of their elimination.

Last year the Nizhnevartovskneftgaz, Krasnoleninskneftegaz and Noyabr'skneftegaz associations of the Main Administration of Petroleum and Gas for the Tyumen Region did not cope with the plan assignments.

The work during the second half of last year in the regions of Western Siberia was seriously complicated by unprecedentedly high waters and continuous rains. However, the results of the activity of the collectives of Siberians should not depend on weather conditions. It is necessary to show clearly that the development of the region has entered a qualitatively new stage. The monitoring of the operation of each well and each object of the oil field facilities should be set up. And all this is linked with the increase of the reliability of highways and electric power and pipeline systems and, first of all, with the formation of stable, enthusiastic collectives in the petroleum-producing process--brigades and shops for the production of petroleum and gas, the servicing of wells, the maintenance of reservoir pressure and others.

The brigade is the master at the deposit, it controls the actions of many related subdivisions.

The brigades for the production of petroleum subject to the well stock being serviced and the local conditions should be furnished with all the equipment needed by them. The brigades for well servicing should be attached to them, that is, multiple-skill brigades, the workers of which are united by a common ultimate goal and a unified system of the remuneration of labor for the fulfillment of the set assignment on petroleum production, should be set up. It is necessary for brigade cost accounting to be introduced in these collectives.

At the same time the role and responsibility of petroleum- and gas-producing enterprises should be increased, having provided them with equipment and the corresponding bases. They should be responsible for the development of the entire complex of oil field facilities of their region and the serviceability of the well stock and should not relax for a minute the monitoring of the development of deposits.

For the improvement of the situation with the operating well stock at the Samotlor and Fedorovskoye deposits the Nizhnevartovskneftegaz and Surgutneftegaz associations and the corresponding petroleum- and gas-producing administrations need to step up the work on the introduction of the gas-life method of well operation. Especially as positive experience of this work exists at the Pravdinskoye deposit of the Yuganskneftegaz Association.

For the purpose of eliminating the consequences of the unsatisfactory weather conditions of the second half of last year all the recovery operations should be performed before the spring high water. In this matter the assistance, which has been given to the petroleum industry workers by the national economy, should be used with the maximum efficiency.

New, very important tasks on the implementation of the USSR Energy Program have been set for the workers of the petroleum industry for 1984. The production of petroleum with gas condensate in the country should come to 624 million tons, including more than 603 million tons for the Ministry of the Petroleum Industry. The greatest increases will be obtained in the regions of Western Siberia, the Komi ASSR and Western Kazakhstan. For the assurance of the planned level of production the necessary material, technical, manpower and financial resources have been allocated to the sector.

In 1984 more than 28 million m of development and producing wells have to be drilled.

The further increase of drilling operations has been planned for the Main Administration of Petroleum and Gas for the Tyumen Region. The task of many collectives of the sector, which are participating in the development of the Western Siberian Petroleum and Gas Complex, is to achieve this.

At the December (1984) CPSU Central Committee Plenum the most efficient use of the created production, scientific and technical potentials was named as the general direction of the intensification of production.

It is important in all regions to improve the use of the well stock. This especially pertains to the Main Administration of Petroleum and Gas for the Tyumen Region, the Komineft', Embaneft', Aktyubinskneft', Permneft' and Turkmenneft' associations. The prevailing standards of the shutdown of wells should not cast a spell, the task of ensuring the placement of all wells into operation should be set.

Important tasks on the improvement of the use of productive capital face the gas processors. They together with the oil field workers should ensure the complete utilization of the gas processing plants in Western Siberia.

The further development of scientific and technical progress is the heart of the work on the fulfillment of the 1984 program. First of all in the area of the increase of the petroleum yield of reservoirs and the chemicalization of technological processes. In this connection the Soyuztermneft' and Soyuzneftepromkhim scientific production associations should increase significantly the level of their work.

The Ministry of the Chemical Industry, the USSR Ministry of the Petroleum Refining and Petrochemical Industry, the Ministry of Mineral Fertilizer Production, the Main Administration of the Microbiological Industry, the Ministry of Chemical and Petroleum Machine Building, the Ministry of the Electrical Equipment Industry and other ministries and departments should give more and more assistance to the petroleum industry workers. All the operations on these problems should be conducted in strict conformity with the outlined scientific and technical comprehensive goal program.

The implementation of the program on the development and assimilation of technological processes and equipment in drilling for the purpose of substantially improving the technical and economic indicators of drilling operations is another important task. Given the rapid increase of the amounts of drilling, its

technical and economic indicators lag for the present behind the assignments of the five-year plan. There are significant reserves here. It is necessary to decrease the unproductive expenditures of time, to use equipment efficiently and to increase the level of production and technological service. The assignments on the increase of the technical level and the increase of the volumes of production of drilling equipment, tools and materials are not being completely fulfilled.

The operations on the complete mechanization of petroleum- and gas-producing enterprises are lagging, although their successful performance makes it possible to increase labor productivity. Whereas in the Bashneft', Tatneft', Udmurtneft' and Orenburgneft' associations more than 90 percent of the petroleum is produced at automated fields, the specific production at such fields in the Main Administration of Petroleum and Gas for the Tyumen Region for the present is significantly less. It is impossible to tolerate this. Particular attention should be devoted to labor-saving measures in Western Siberia.

The rate of the development and improvement of production to a decisive extent depends on the efficient work of construction workers. However, it is impossible to regard as satisfactory the state of affairs in capital construction. The plan of construction and installation work was fulfilled by only 87.6 percent. The fact that the amount of performed construction and installation work last year was somewhat less than in 1982, is causing great anxiety. It is totally intolerable that last year in the sector its own construction organizations did not fulfill the plan of construction and installation work.

In 1984 8.7 billion rubles of capital investments, including 2.7 billion rubles of construction and installation work, have to be assimilated for the development of the sector. More than 4,000 km of main petroleum and gas pipelines, including the Kholmogory-Klin petroleum pipeline, the Western Siberia - Ural-Volga River Region product pipeline, 24 transfer pumping stations, 1.8 million m³ of storage tanks, more than 11,000 km of oil field pipelines and a large number of other facilities should be put into operation.

It is necessary to supply construction projects completely with the lacking technical specifications and component equipment and to distinguish those responsible for start-up complexes. The tightening up of planning discipline, the increase of the personal responsibility of managers for the timely placement of each project into operation and the fulfillment of the assignments on the retooling and renovation of production are a decisive factor of success.

The implementation of a set of measures on the saving of material and labor expenditures, the intensification of production and the improvement of the use of productive capital is an important task in the sector. This work should be opposed to the deterioration of the mining and geological conditions of the working of deposits.

Here the decrease of the labor expenditures on the production of output and the amount of work is acquiring particular importance. The assignment on the decrease of labor expenditures per well was established for the sector by the 26th CPSU Congress. This assignment is being fulfilled. However, it encompasses only a portion of the industrial personnel of the sector, who are

directly engaged in production. This indicator has to be extended to all types of activity.

The key question is consideration for all the resources which are being allocated by the national economy for the development of the sector. It is important that along with great demandingness and the responsibility of each worker for the assurance of the strictest policy of economy material- and energy-saving equipment and technology and advanced rates of consumption of raw materials and materials would be actively developed and be introduced extensively. It is necessary to increase the material interest in the saving of resources.

At the December (1983) CPSU Central Committee Plenum and the 9th Session, 10th Convocation, of the USSR Supreme Soviet the main sociopolitical goal of our plans--the increase of the well-being of the Soviet people--resounded with new force.

Last year the state of affairs with the construction and placement into operation of nonproduction facilities in the sector improved noticeably. The plans on the placement into operation of hospitals, polyclinics, schools and children's preschool institutions were fulfilled and exceeded. However, the plan of the placement of housing into operation was not fulfilled.

In 1984 about 1.5 million m² of housing, including 900,000 m² in Western Siberia, have to be put into operation, many kindergartens, schools, hospitals and polyclinics have to be built. The managers of associations and enterprises should constantly keep in their field of view the progress of the construction of housing and sociocultural facilities.

In spite of the improvement of the work in the area of labor safety procedures and labor safety techniques the state of affairs with respect to the prevention of accidents and injury at the enterprises of the sector is causing anxiety. Economic managers and trade union organizations should devote even more attention to the protection of the labor and health of the workers.

The measures on the implementation of the Food Program hold a significant place in the sectorial plans. In 1983, 30 new subsidiary farms were organized at the associations and enterprises of the sector, the volume of commodity production of subsidiary farms and sovkhozes increased. However, a number of farms (of the Main Administration of Petroleum and Gas for the Tyumen Region, the Orenburgneft' and Tomskneft' associations, the Soyuztermneft' Scientific Production Association) did not cope with the plan of the production of the basic types of agricultural products.

This year it is planned to increase the output of agricultural products by 6 percent. The material and technical base of subsidiary farms and sovkhozes will be strengthened, new farms will be set up, measures on the intensification of the use of lands will be implemented.

The collective of the Yuganskneftegaz Association came forward with the initiative to launch socialist competition for the successful fulfillment and exceeding of the plan assignments of 1984. The Collegium of the Ministry and the Presidium of the Central Committee of the Petroleum and Gas Industry Workers Union

endorsed this patriotic initiative. It met with a warm response in all the petroleum regions of the country.

The assumed socialist obligations for the sector as a whole (they will be published in the next issue of the journal--Editor) envisage to ensure in 1984 the above-plan production of 2 million tons of petroleum with gas condensate and 200 million m³ of gas. The workers of the petroleum industry have assumed obligations on the exceeding of the plans on labor productivity by 1 percent and the decrease of operating costs by 0.5 percent.

The great production potential of the sector and the creative initiative of the petroleum industry workers, which is backed by much organizing work of economic managers and party and trade union organizations, serve as a guarantee of sure successes in the development of the petroleum industry in 1984 and in the fulfillment of the decisions of the December (1983) CPSU Central Committee Plenum.

The petroleum industry workers will devote all their efforts, knowledge and experience to the accomplishment of the socioeconomic tasks of the building of communism and to the fulfillment of the assignments which were set for the sector by the 26th CPSU Congress.

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OIL AND GAS

SERVICING OF UZEN OIL WELLS

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 28 Mar 84 p 1

[Article by K. Tolbanov, chief of the Technological Department of the Uzen'-neft' Administration (Novyy Uzen, Mangyshlak Oblast): "So That the Wells Would Not Be Idle"]

[Text] The Uzen petroleum deposits have been worked for more than 20 years. The paraffin, in which it is rich, by settling on the pipes and in the pumps, quickly disables the underground equipment of oil wells. During this time corrosion has done enormous destructive work. That is why the successes of the oil producers directly depend on the timely and high quality repair of underground equipment.

How were the problems of underground repair solved last year, what is being done this year? K. Tokbanov, chief of the Technological Department of the Uzen'neft' Administration, tells our correspondent about this.

I will begin with figures. Our underground repair shop coped successfully with the plan of last year. In all 4,194 wells were repaired, which is 125 wells more than was planned. And still we realize that we are not capable today of meeting the needs of the field workers: nearly 150 wells are idle daily pending repair. And with each day, unfortunately, there are more and more such wells. This is explained by the acute shortage of specialists, the lack of equipment and the poor technical equipment of brigades. All our attempts to increase sharply the number of brigades of underground repairmen have ended in failure. In the past 5 years we have been able to set up only seven new brigades. That is why other means of solving the problem had to be sought. It was necessary to increase the labor productivity of the already existing brigades and to increase the quality of the repairs being performed. Time showed that we did not make a mistake in the choice of the goal.

Underground repair expert A. Bekverdiyev, who is well known in Mangyshlak, proposed 2 years ago to change the organization of the labor of the brigade headed by him so that in case of the increase of its size by only a third it would be possible to increase labor productivity by twofold. The essence of the innovation consisted in working not in four shift teams, as is usual, but in five. And to service in this case not one, but two underground devices. The

reckoning of the foreman is simple. Work at two hoists makes it possible to eliminate practically completely the unproductive losses of time, which are connected with trips to a new point, the assembly and disassembly of equipment. And, moreover, to work in reality at two wells simultaneously. The future belongs to the new method. Here are the figures. Bekverdiyev and his comrades repaired last year 335 wells, about 28 wells a month. For comparison I will note that on the average for the shop there are only 176 repairs, that is, 14.3 repairs each a month, per brigade.

But it is not that easy to introduce the new method, it is difficult to follow the example of an innovator. Last year we planned to organize three brigades which work at two hoists. It did not work out. Only now has it been possible to set up another brigade, the second in number. What is the matter here? Is it personnel? Not at all. For the method is also good for the fact that it does not require additional skilled manpower. Moreover, we have today at least five brigades which would be quite able to work in the new way. The trouble is that you can count on the fingers of one hand how many hoist units we have. Worse than that, many of the existing hoists are worn out to such a degree that they require immediate replacement. In making the request for 1983, we asked the Mangyshlakneft' Association to allocate to us 10 hoists, they promised us 5, but we received only 3. The situation is also not improving this year. The hoists available in our brigades operate today in wear, without any planned preventive maintenance.

All this cannot but affect the results of the work of the oil producers. Last year the idle times of the brigades due to hoists came to 4,500 hr, which is equal to almost 100 repairs or 400,000 tons of unrecovered petroleum. Thus, the future of the method of Bekverdiyev in many ways will depend on the position of the Mangyshlakneft' Association, on how quickly it will be possible to create the elementary conditions for the normal operation and maintenance of the scarce equipment.

At the same time as the experiment of Bekverdiyev another one was conducted. I have in mind the order-free system of the remuneration of the labor of three underground repair brigades, which service the fifth oil field. Its point also consists in the fact that our repairmen would work together with the oil production brigades and would think about the end result. The indicators, which direct the attention of the underground repairmen first of all to the decrease of the idle well stock and the increase of their overhaul life, act as the main ones. And finally, to the increase of oil production. Recently we analyzed the work of the three brigades of the fifth oil field. The results are reassuring. In 1 year the overhaul life of wells increased from 203 to 270 days, while the number of wells idle daily decreased from 17 to 8.

In short, the experiments, which are connected with the improvement of the brigade form of the organization and remuneration of the labor of underground repairmen, have been completed. And it is necessary to seek possibilities to derive the greatest possible benefit from the acquired experience.

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OIL AND GAS

PETROLEUM ASPHALT OF NORTHEASTERN CASPIAN REGION

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 28 Mar 84 p 2

[Interview with Candidate of Chemical Sciences G. Musayev by KAZAKHSTANSKAYA PRAVDA correspondent G. Kazantsev (Guryev): "Petroleum Metallurgy"]

[Text] Dark brown rocks with the smell of petroleum, so-called petroleum asphalts, were recently discovered by geologists in the Northeastern Caspian region. They are easily accessible--at times they directly crop out and occur at depths of not more than 500-600 m. An increased interest of scientists in the discovery of the origin of the rare mineral, the study of its chemical composition and then the determination of the degree of practical use for national economic goals arouse quite naturally.

Tens of scientific institutions of the country and Kazakhstan are now engaged in the comprehensive study of the important problem. At the Guryev Institute of the Chemistry of Petroleum and Natural Salts the collective of one of the laboratories has been carrying out this work for many years. At a result of long-term experiments a quite effective technology of the processing of natural asphalts, which makes it possible to extract light petroleum products and gaseous substances from the new fuel raw material, was found here for the first time in the country. One of the authors of the scientific development, Candidate of Chemical Sciences G. Musayev, tells about the prospects of the use of this achievement.

[Answer] The associates of our laboratory began the search not at a bare spot. At the institute Candidate of Technical Sciences S. Meshcheryakov had dealt a great deal and fruitfully with the solution of the problem. The foresight of his scientific forecasts are also helping us now.

I will note that at that time a categorical opinion of authorities existed--petroleum asphalt sands are unpromising, their proved reserves are more than modest. And, what is the most important thing, they did not know how to use this raw material, which contains petroleum, because they did not know how to process it.

[Question] If you were to translate it into the language of Mendeleev's periodic table, with what would petroleum asphalt rocks be filled?

[Text] This is a sand, which is saturated with petroleum and natural asphalt, it contains placers of rare metals, including vanadium, cobalt and nickel. More simply speaking, this is petrified petroleum. S. Meshcheryakov was the first to use the rock as a construction material for superhighways. A very hard surface, which does not suffer from the heat of the desert, hard frosts or abundant precipitation, is obtained with the addition of the waste products of the local chemical plant. In the rayon center of Kulsary 13 km of main highways were laid in accordance with the new technology. The many years of intensive use have confirmed the durability of its armor.

However, it is wasteful to dispose of natural resources that way. As long-term laboratory studies showed, the natural asphalt of a number of deposits is highly saturated with liquid hydrocarbons. In some samples their content is 60-65 percent of the total weight. From these high-molecular compounds we are able to obtain, true, for the present at miniature pilot plants, gasoline of different grades, propane, propylene and isobutane gases--the most important raw materials for obtaining polyethylene of different grades. Moreover, coke, which is used for the blast-furnace process and for the production of electrodes, forms at the same time. After the processing of the rock a gray sand remains--the finished construction material. Thus, it is possible to decrease the importing of sand for economic needs to Guryev Oblast, which was deprived by nature of inert materials.

[Question] Is the waste-free extraction of raw materials being obtained?

[Answer] After the laboratory sublimation of the natural asphalt we do not have any worthless products left. Scarcely had the results of the experiments been published by us, when an interest in scientific circles in the productive possibilities of petroleum asphalt sands appeared. Now specialists of the All-Union Scientific Research Institute of the Petroleum Industry (VNIINP) are involving themselves in our work. They asked us for samples of the raw material. At the Institute of Metallurgy and Ore Dressing and the Institute of Nuclear Physics of the republic Academy of Sciences and the Institute of Petroleum Chemistry of the Siberian Department of the USSR Academy of Sciences they have begun studies of the content and the possibilities of the obtaining of metal components from the sand which is being extracted by us.

[Question] How was it possible to reveal the secret of the combustible sands?

[Answer] Our approaches to the unique mineral stores began with the organization at the institute of a laboratory which is now called "The Chemistry and Technology of Petroleum Asphalt Rocks." The creation of a solid research base and the allocation of a staff of scientific associates, engineers and laboratory workers are the service first of all of Kazakh SSR State Prize winner N. Nadirov, director of the Guryev Institute of the Chemistry of Petroleum and Natural Salts.

The discovery of the content of petrified petroleum by means of the classical methods of the decomposition of petroleum at operating enterprises proved to be

futile. A fundamentally new technology was required. We designed a thermal reactor. Only after having tested hundreds of modes of the liquefaction of the raw material in a medium of various gases, was it finally possible to stabilize the technology of the decomposition of petroleum asphalt rock.

Now we have ordered equipment in order to change over from miniplants to the pilot industrial road-testing of the idea--the elaboration of practical recommendations on the refining of the petrified petroleum into liquid, solid and gaseous products, which it is possible to obtain given specific temperature indicators.

Petroleum metallurgy has a future. For comparison I will cite an example. From a ton of petroleum at refineries they obtain 10-15 percent gasoline and 20-25 percent motor oils. The remaining 50-60 percent are tar, from it they produce coke and fuel oil for heat and electric power stations and boiler houses. Irrecoverable losses are present. The technology found by the institute of thermal cracking, that is, decomposition in the process of the melting of oil sands into the component ingredients, makes it possible to obtain several fold more light petroleum products and gas--raw material for the chemical industry. It is possible with the same success to extract light petroleum products from furnace fuel oil--for the present an inevitable waste product of petroleum refineries. But this will become possible if our plants are moved from the laboratories to plant shops.

[Question] Has the impact of the industrial working of petroleum asphalt deposits been capulated?

[Answer] The advantages here are obvious. Thus, from 1 ton of natural asphalt it is possible to obtain threefold more fuel of all grades, not counting the associated useful components, about which I spoke earlier. And the method of extraction is much more simple and economical. For before feeding the petroleum into the plants, it has to be desalted and dehydrated--be prepared for distillation. It is necessary to take into account the high content of sulfur in liquid fuel, which leads to rapid corrosion and the need for the constant repair of equipment. These expensive and burdensome troubles disappear with the use of our thermal reactor units.

It should be taken into account that the reserves of petroleum asphalt rocks in our country are enormous. In Western Kazakhstan alone about 50 deposits have already been explored. Valuable fuel and metallurgical raw materials have been found in Azerbaijan, Tataria, Western Siberia and Yakutia. Petroleum asphalt rocks are considered a gold reserve, a resource of our state. Billions of tons of petroleum asphalt sands are contained in the depths of just the Tobedzhikskiy deposit on Buzachi Peninsula. It is easy to extract from them tens of millions of tons of light petroleum products alone in accordance with the technology of melting down the rock, which is proposed by us.

Petroleum asphalt is a loose material, can be extracted by the open-cut method, is easily transported, is significantly cheaper and more accessible in case of refining into light and gaseous products. In addition there is also free material for structural components.

The competitive ability of the mineral, which for the present is not being used, with petroleum is indisputable. In scientific circles it is believed that the fuel industry is on the threshold of an important stage of development, if, of course, it is possible to commit to processing on an extensive scale the stores of combustible rocks. In connection with the depletion of the reserves of "black gold" the period of the extraction of petroleum from petroleum asphalt sands will come. The efforts, research and finds of scientists are subordinate to the enlistment of these vast resources for the reinforcement of the fuel and energy potential of the country.

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CSO: 1822/256

OIL AND GAS

YAREGA OIL MINE COMPLEX CONSTRUCTED

Moscow NEFTYANIK in Russian No 3, Mar 84 p 11

[Article by USSR State Prize winner Yevgeniy Ivanovich Gurov, chief engineer of the Yareganef't' Oil Mine Administration: "A New Oil Mine Is Being Built"]

[Text] The construction of the new Oil Mine No 2-bis, the fourth in number, has begun at the Yarega deposit of heavy petroleum in the Komi ASSR. For the first time in domestic and world practice from the first days of operation of the new enterprise petroleum production at it will be carried out by the thermal shaft method. The new technology was developed by specialists of the Yareganef't' Administration and the Pechora Scientific Research and Planning Institute of Petroleum.

At the request of our corresponding V. Il'in USSR State Prize winner Yevgeniy Ivanovich Gurov, chief engineer of the Yareganef't' Oil Mine Administration, comments on this novelty.

A complex of buildings and structures over the mine, which includes an administrative and personal service complex, buildings of the shafts, hoisting and ventilation units, a pumping and electric power substation, machinery and repair workshops and other facilities, as well as the oil mine proper, will be a part of the new enterprise. At the beginning of construction separate facilities, a dirt pit and treatment facilities have to be developed, a road to the production site of the mine and engineering networks: a petroleum pipeline, a water main, heating mains, an air line, sewage collectors, electric power transmission, communications and radio lines, have to be laid.

It is planned to perform a large amount of mining operations. An underground shaft and a ventilation shaft, an underground pit-bottom and a branched network of mine workings will be built. The shaft area is broken down into a large number of sloped blocks, the working of which will be carried out from the underground galleries. The plan envisages the use both in the process of construction and during the period of operation of the mine of the latest mining equipment and modern technology, means of automation and teleautomation.

The operation of the new mine will require additional manpower. Therefore the construction in the settlement of Yarega of apartment houses with all modern conveniences and sociocultural and personal service facilities is envisaged by the plan. More than 5.5 million rubles are being allocated for these purposes.

The practical implementation of the plan has already begun. Having completed the preliminary work in the fall of last year, the drift miners of the Ukhta section of the Donetsk Shakhtspetsstroy Shaft Building Administration began the sinking of the vertical underground shaft of the mine. Its planned depth will exceed 200 m, while its diameter will exceed 8.5 m.

Due to the complex geological mining structure of the section and floating earths the shaft builders with the first meters had to use the method of the sinking of the shaft with the preliminary freezing of the earth. For this a heavy-duty refrigerating station was installed at the production site of the future mine. Its compressors pump freon into specially drilled holes. Circulating through the holes, the freon in case of a negative pressure freezes the earth, turning the floating earths into monolith. Then the drift miners set to work, they break up the rocks with jack hammers. The sinking of the shaft collar was carried out in this way. Clam-type loaders and other means of the mechanization of mine drifting operations will be used at a greater depth.

A staff for the management of the construction of Oil Mine No 2-bis has been set up in the Komineft' Association. A. S. Gumenyuk, general director of the association, heads it. The staff settles promptly the questions of the acceleration of the drawing up of planning documents, the material and technical supply of the construction project and the coordination of the actions of all the participants in the construction.

Upon reaching the rated capacity Mine No 2-bis will become the leading petroleum-producing enterprise in the administration.

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OIL AND GAS

LABOR PRODUCTIVITY, PRODUCTION COST AT URENGOY DEPOSIT

Moscow EKONOMICHESKAYA GAZETA in Russian No 9, Feb 84 p 6

[Article by USSR State Prize winner Ivan Spiridonovich Nikonenko, general director of the Urengoygazdobycha Association: "The Rapid Pace of Urengoy"]

[Text] The Urengoy deposit has become the main base of the increase of gas production in the country. I. S. Nikonenko, general director of the Urengoygazdobycha Association, tells about the basic directions of the work on the assurance of the above-plan increase of labor productivity and decrease of the production cost.

After graduating from Kharkov University Ivan Spiridonovich Nikonenko worked at the gas fields of the Ukraine. In 1966 he was sent for the development of the deposits of Western Siberia. He worked as the chief of a shop at the first gas field of Siberia--the Igrim deposit, then developed the Medvezhye deposit in Nadym. He has headed since the first days the production association for the development of Urengoy. I. S. Nikonenko is a USSR State Prize winner.

The thrilling minutes, when the flow of Urengoy gas rushed through the transcontinental pipeline to the center of the country from the buildings of the first complete gas treatment plant, which were sparkling in the spring sun, are still fresh in my memory. This was in April 1978, on the birthday of V. I. Lenin.

Since then our circumpolar region has changed beyond recognition. In accordance with the will of the party and by the efforts of all the Soviet people 10 complete gas treatment plants--powerful plants for the preparation of gas for transportation--and other large production facilities rose on the untrodden tundra. A mighty system of main pipelines, among them the unique Urengoy-Pomary-Uzhgorod artery, originates here.

Our gas field complex is developing especially dynamically during the 11th Five-Year Plan. In the past 3 years the amounts of work on construction at the deposit have increased by fivefold, a steady annual increase of the production of 'blue fuel' has been achieved. Its extraction from the ground and transportation have increased by more than threefold.

At the beginning of the five-year plan gas production operators R. V. Khvorostyanova, a delegate of the 26th party congress, and V. S. Zakharenkov, a USSR State Prize winner, and the collective of Production Operation Service No 1 of our administration jointly with other collectives of the oblast came forth with the initiative on the early achievement in 1985 of the recovery from the Tyumen fields of 1 billion m³ of gas a day. The CPSU Central Committee endorsed this initiative.

The Urengoy workers should contribute the main share to the Tyumen billion. Each brigade, section, shop and administration have specified their specific contribution to the common goal, have outlined the gains for each year, quarter and month and are actively participating in the competition for the achievement of what has been outlined.

The Impact of the Initiative

In the socialist obligations for 1984 the collective of the association recorded: "To increase labor productivity in excess of the plan by 1 percent, and to decrease the product cost additionally by 0.5 percent." The accomplishment of this task will give the national economy during the first year additional hundreds of millions of cubic meters of natural gas. By means of the increase of the efficiency of labor it is planned to shorten the time of start-up and adjustment operations at plants being newly built, to assimilate them ahead of time and to increase gas production by 30 percent, to obtain a significant amount of condensate and petroleum.

The tasks are responsible. But we are confident of their practicability, since we already have experience of such progress. Since the beginning of the five-year plan, for example, labor productivity in the association has increased by more than twofold and exceeds the planned labor productivity. Moreover, last year the growth rate was the highest. The product cost has decreased annually on the average by 0.4 percent.

It is well known that the natural and climatic conditions of our region are difficult. A portion of the fields are beyond the Polar Circle, in the zone of permafrost. In the winter there are the polar night and snowstorms, in the summer--impassable swamps. Much from the traditional methods of the development of deposits and the organization of gas production is not suitable here. It is also impossible to accomplish the posed tasks by the simple increase of the number of workers.

From the first steps, in practice without yet having bases, we assimilated the complete block construction of gas treatment facilities and the cluster drilling of large-diameter wells and introduced in production unique domestic equipment of increased unit power. For example, owing to the joint efforts of construction workers, designers and operators the ninth complete gas treatment plant, which was built by the complete block method in a third of the standard time, was put into operation during the period of the start-up of the Tyumen section of the Urengoy-Uzhgorod gas pipeline.

By means of renovation and modernization it was possible to increase the productivity of the last plants by 30-40 percent. All this, given the negligible

expenditures, is making it possible to additionally obtain many billions of cubic meters of gas.

I will especially point out the work of efficiency experts. Its level, in my opinion, characterizes in the best possible way the creative potential of the collective. They are united here into 42 creative brigades, for them the themes of the problems have been elaborated, consultants have been attached and competition has been organized. And the yield from research of innovators is significant. During the past 5 years nearly 1,200 proposals with an economic impact of about 3 million rubles have been adopted. This year it has been decided to increase this contribution by 1.5-fold. The creative search of such innovators as foremen G. Kucherov, A. Sivkov and V. Gavrilov, engineers N. Molotov and G. Tsepelev and others guarantees the achievement of what has been outlined.

The Basic Form Is the Brigade Form

The extensive introduction of the brigade forms of the organization and stimulation of labor is helping us to increase the yield of fixed capital and to tighten up discipline and responsibility in all the sections. Nearly all the workers of the main works are now united in brigades, the number of brigades in the ancillary shops is also increasing. Their labor is evaluated, as a rule, according to the end results. Just recently, for example, the workers of our Urengoystroygazdobycha Trust were oriented only toward the volumetric indicators. At the same time a number of projects were being put into operation late. The administration and party committee of the trust performed much explanatory and organizational work and organized the training of engineering and technical personnel and brigade leaders. As a result it was possible to organize the brigade contract at the majority of projects under construction. Last year alone 1.5-fold more work was performed by this method than before. In spite of the sharply increased program, the trust successfully coped with the assignments of last year and has made a good start this year. True, for the present it is still too early to speak about the finish of this work. At the recent party meeting of the trust, which was held to hear reports and elect new officials, we happened to hear from communists about several difficulties of local cost accounting (the problems of the material and technical supply of brigades, their provision with transport and planning estimates), but the persistence, with which they dealt here with this matter, guarantees it further success.

In all 100 multiple-skill and 180 specialized brigades have been set up in the association. We are directing particular attention to the multiple-skill brigades, which ensure the performance of complete cycles of operations and which it is easier to change over to remuneration for the end result. The specialized brigades fulfill local tasks in accordance with contracts with the administration, which also ensures the evaluation and remuneration of labor according to the end results.

In order to stimulate the brigades, which have actively joined in the movement for the above-plan increase of labor productivity by 1 percent and the decrease of the production cost by 0.5 percent, the payment of additional bonuses from the material incentive fund was introduced this year.

The Prospects of Development

Urengoy today is still an adolescent, who has to grow up and get stronger. Therefore it is very important to use efficiently and comprehensively the vast assets which the state is allocating for its further development.

This year alone it is necessary to put into operation 3 complete gas treatment plants, interfield and intrafield collectors for them, 110 km of hard-surface highways and 160,000 m² of housing. By the end of the five-year plan the flow of Urengoy gas will increase by tens of billions of cubic meters, the Valenzhinskiy petroleum deposits will be developed, the production and processing of condensate will increase.

In short, an intensive, but practicable program has been outlined. Many collectives, first of all construction collectives, are now engaged in its accomplishment. But it is merely disturbing that they have not yet gathered sufficiently forces for this. For example, the organizations of the Ministry of Construction of Petroleum and Gas Industry Enterprises have accepted for fulfillment only 58 million rubles of construction and installation work of the 112 million rubles, which are necessary for the building of the start-up complex for the production of condensate.

It also seems necessary to speed up sharply the construction of hard-surface roads and bridges over rivers, which has been entrusted to the Ministry of Transport Construction. Both the construction workers and the gas producers hope that steps will be taken on the part of the USSR Ministry of Power and Electrification for the guaranteed supply of the complex with electric power, for which the construction workers of this ministry should bring closer the date of the placement of the Urengoyskaya GRES into operation, while in the immediate future they should run a backup line from the Surgutskaya GRES.

The program of the rapid development of the region during the 11th and 12th Five-Year Plan requires that particular attention be directed to the observance of the proportion of industrial and civil construction. According to the new master plan Novyy Urengoy is designed for 160,000 residents. Consequently, the construction of housing and sociocultural and personal service facilities has to be expedited.

For this in the system of our association, which has assumed the functions of the general client, the formation of a board of directors for the construction of the city is being completed and a repair and construction trust is being organized. Now for the acceleration of the rate of the building up of the city the need has arisen to approve one general contractor for civil construction in the person of the Main Administration of Housing Construction in Western Siberia, to set up an affiliate of the planning institute in the city and to settle the question of a house building combine.

The people of Urengoy are looking confidently into the future. The collective of our association will do everything in order to fulfill honorably the assignments of the party and government, the plans and obligations of the fourth year and the five-year plan as a whole.

OIL AND GAS

NEW PROCESSING COMPLEXES AT OIL REFINERIES

Kiev RADYANS'KA UKRAYINA in Ukrainian 26 Feb 84 p 1

[Official congratulatory messages: "Congratulations on Labor Successes!"]

[Text] To Those Participating in Building New Production Facilities at the Lisichansk and Mazheykyay Oil Refineries of the USSR Ministry of Petroleum Refining and Petrochemical Industry

Dear Comrades!

The CPSU Central Committee warmly and heartily congratulates you on successfully meeting socialist pledges -- on completion of construction and ahead-of-schedule movement on-stream of large new production facilities for primary oil refining at the Lisichansk and Mazheykyay oil refineries, as well as other facilities, which are improving the quality of motor fuel.

Built in a short period of time and furnished with high-output equipment and means of automation, the new facilities have brought the Lisichansk and Mazheykyay oil refineries into the ranks of the industry's largest enterprises. They are of considerable importance in supplying the areas of the Ukraine and the Baltic with refined products. Simultaneously with construction of industrial installations, decent housing and cultural-services facilities were built for the workers.

Highly valuable is the fact that the oil refinery workforces have pledged to better the standard timetable for bringing the installed facilities into production.

Your labor successes are a specific contribution toward implementing the decisions of the 26th CPSU Congress pertaining to building up our country's fuel-energy potential.

We wish you, dear comrades, excellent health and additional labor successes in implementing the tasks assigned by the December (1983) and February 1984) CPSU Central Committee plenums and in achieving the plan targets for 1984 and the 11th Five-Year Plan as a whole.

Central Committee of the Communist Party
of the Soviet Union

To All Participants in Building and Bringing On-Stream the Petroleum Processing Complex at the Lisichansk Oil Refinery of UkSSR Glavneftekhimprom

Dear Comrades!

The Central Committee of the Communist Party of the Ukraine and the UkSSR Council of Ministers warmly congratulate you on your great labor victory -- ahead-of-schedule movement on-stream, as specified by socialist pledges, of an oil refining installation at the Lisichansk Oil Refinery.

In a very short period of time you have erected a large, modern production facility, containing high-output equipment of large unit capacity, which will make it possible to improve supply of high-grade refined products to the nation's economy. Simultaneously with development of the refinery, decent housing, a school, a vocational school, and social-services facilities have been built for the workers.

Your achievement is a result of selfless labor by workers, engineers, and technicians, of effective socialist competition, and of great organizational and political work on the part of the party, trade union, and Komsomol organizations of the construction project, city of Lisichansk, and Voroshilovgrad Oblast.

The Central Committee of the Communist Party of the Ukraine and the UkSSR Council of Ministers express confidence that the construction workers will continue in the future building up the refinery's production potential at a rapid pace, and that operating personnel will bring facilities on-line ahead of schedule.

Dear comrades, we wish you continued labor accomplishments in implementing the decisions of the 26th CPSU Congress and accomplishment of the tasks advanced at the December (1983) and February (1984) CPSU Central Committee Plenums.

Central Committee of the Communist Party
of the Ukraine

Council of Ministers of the
Ukrainian SSR

3024

CSO: 1811/52

COMPRESSOR STATIONS

UDC 622.691.4

NEW ENERGY SAVING EQUIPMENT FOR PIPELINES ANALYZED

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 4, Apr 84 pp 27-29

[Article by M. B. Chernobyl'skiy, V. M. Grigorenko and L. D. Shor, SPKB Proyektneftegazspetsmontazh, VNIIST [Special Planning and Design Office for Oil and Gas Special Installation Design, Scientific Research Institute for the Construction of Main Natural Gas Pipelines]: "Energy Saving Technology for Gas Transport"]

[Text] The more accurate estimation of gas pumping energy costs over a wide range of basic parameters will permit a better based approach to designing future main gas lines and improve their operational efficiency.

The transportation of ever growing amounts of gas from West Siberian fields to gas consuming regions, located primarily in the European part of the country, increases gas consumption for the operational needs of compressor stations (KS). In the future, the gas industry will be one of the main consumers of gas for process needs. Therefore, the development of energy saving technology for gas transport becomes especially urgent.

This explains the extensive attention which GAZOVAYA PROMYSHLENNOST' gives to problems of improving the economies of gas transport systems [1 - 3].

Continuing this theme, the authors of this article propose a methodology for calculating gas compression capacity, depending upon the distance between KS. We examine low pressure variants for gas pumping and variants with increased distances between KS.

The traditional variant is taken as a standard. The initial parameters are: gas pipeline diameter — 1,420 mm, working pressure — 7.35 MPa, capacity — 32 billion m³ annually, distance between KS — 100 km, compression ratio — 1.44 (as assumed in work [2]), working power of gas pumping units — 48,000 kW/KS, gas consumption (minimal) for KS operational needs — 342 m³/kWh, or 130 million m³/KS annually, number of KS — 30, total gas consumption — 3.9 billion m³ annually.

The annual volume of gas consumption, q, for a single line section is calculated by the formula

$$q = 3.324 \cdot 10^{-6} d^{2.5} \sqrt{\frac{p_b^2 - p_e^2}{\lambda \Delta T_{cp} z_{cp} L}} \quad (1)$$

For all the variants examined below, d , p_b , λ , T_{sp} , Δ are constants.

Gas pressure at the beginning p_b and end p_e of the sections between KS, gas pressure at the inlet, p_i , and outlet, p_o of the centrifugal pump and pressure losses at the inlet, δp_i , and outlet, δp_{oce} and outlet from the KS (δp_i and δp_{oce} are related as follows:

$$p_b = p_o - \delta p_o - \delta p_{oce} \quad (2)$$

$$p_e = p_i + \delta p_i + \delta p_{oce} \quad (3)$$

According to experimental data, the VSN 51-2 -- 79 [Expansion unknown] for $p_b = 7.35$ MPa.

$\delta p_{onc} = 0.04$ MPa is pressure loss at KS outlet without cooling; $\delta p_{oce} = 0.06$ pressure loss in the gas cooling system; $\delta p_i + \delta p_{oce} = 0.15$ MPa -- pressure loss at the KS outlet and the gas cleaning system.

Table 1 presents the losses at the KS inlet and outlet and the corresponding values for pipeline pressure derived from the calculations. Keep in mind that the compression ratio of the centrifugal pump is $\epsilon = p_o/p_i$.

Table 1. Pressure at Various Points of Gas Pipeline, MPa

Type of KS

Base, with cleaning and cooling systems

Intermediate, without cleaning and cooling systems

Hypothetical, with zero losses a inlet and outlet

p_H	p_{BMK}	p_{BK}	p_H
7,35	7,45	$\frac{7,45}{\epsilon}$	$\frac{7,45}{\epsilon} + 0,15 \frac{\epsilon}{1,44}$
7,35	7,39	$\frac{7,39}{\epsilon}$	$\frac{7,39}{\epsilon} + 0,058 \frac{\epsilon}{1,44}$
7,35	7,35	$\frac{7,35}{\epsilon}$	$\frac{7,35}{\epsilon}$

The following formulas are used to calculate p_e for low pressure variants with reduced distance between KS (L) and with the same gas pipeline capacity, 32 billion m^3 annually.

$$\frac{p_b^2 - p_e^2}{z_{cp} L} = A = \text{Const} \quad (4)$$

$$p_k = \sqrt{p_b^2 - A z_{cp} L} \quad (5)$$

We then determine the centrifugal pump's compression ratio. The average coefficient of gas compressibility, z_{cp} in formulas (4), and (5), is calculated by the method of successive approximation for 3 types of KS and 7 values of L. The values of z_{cp} change within narrow ranges, less than 2 percent. However, these changes were taken into consideration in calculating p_e and ϵ .

Based on the laws of gas dynamics, the KS working capacity is determined from these formulas:

$$N_{KS} = B \frac{m}{m-1} \frac{p_i Q_i}{\eta} \left(\epsilon^{\frac{m-1}{m}} - 1 \right) \quad (6)$$

Where m -- the coefficient of polytropy (for natural gas $m = 1.31$; $\frac{m-1}{m} = 0.2366$); η -- the pump's polytropic efficiency factor; Q_i -- the volume flow rate at the inlet; B -- coefficient of adjustment [privedeniye].

When gas line productivity for all low pressure variants is taken as constant, then $p_i Q_i$ is also constant.

The power consumed by the KS to compress gas is then:

$$N_{KS} = N_{SV} \frac{\left(\epsilon^{0.2366} - 1 \right) \eta_{SV}}{\left(\epsilon_{SV}^{0.2366} - 1 \right) \eta} \quad (7)$$

The index "SV" means standard variant.

The compression ratio, ϵ , of the centrifugal pump is determined from the magnitude of p_k . The pump's efficiency factor, η , depends upon the compression ratio, while KS capacity depends upon ϵ and η . Table 2 gives the values of these parameters for 3 types of KS and 7 variants of distance between KS.

Parameters	Spacing between KS, km.						
	100	66.7	50	33.3	25	20	10
Base KS							
ϵ	1.440	1.251	1.182	1.123	1.108	1.082	1.054
η	0.830	0.847	0.854	0.858	0.860	0.863	0.866
N_{KS} kW	48 000	28 400	20 890	14 340	11 330	9 640	6 390
Intermediate KS							
ϵ	1.403	1.225	1.158	1.102	1.087	1.062	1.036
η	0.833	0.849	0.856	0.861	0.863	0.865	0.868
N_{KS} kW	44 270	25 620	18 240	11 940	9 120	7 320	4 280
Hypothetical KS							
ϵ	1.379	1.208	1.143	1.089	1.075	1.050	1.024
η	0.835	0.851	0.857	0.862	0.864	0.866	0.869
N_{KS} kW	41 830	23 750	16 580	10 450	7 540	5 930	2 860

The following scheme for KS location was used in calculating N_{KS} :

A base KS is planned for every 100 km (this KS has gas cleaning and cooling systems) and there are intermediate KS between the base units. For example, for a station spacing distance of 66.7 km on a 200 km line there should be 2 base and 1 intermediate KS.

An increase in the spacing between KS compared to the standard variant, but retaining the present compression ratio ($\epsilon=1.44$), leads to reduced capacity for each line. In addition, average gas speed declines proportionally to productivity. The flow of gas in the line is subject to the square law, the power to move a cubic meter of gas is proportional to the square of its speed.

Table 3 gives the results of calculations for KS basic parameters for low pressure variants and variants with increased spacing between KS.

Indicators	Spacing between KS, km									
	300	200	150	100	66.7	50	33.3	25	20	10
(1) Производительность газопровода, млрд. м ³ /год:										
(2) валовая	18,46	22,62	26,11	32,00	32,00	32,00	32,00	32,00	32,00	32,00
(3) товарная	17,71	21,24	23,99	28,10	28,65	28,82	28,90	28,86	28,84	28,35
(4) Расход топливного газа на собственные нужды КС, млрд. м ³ /год	0,75	1,38	2,12	3,90	3,35	3,18	3,10	3,14	3,16	3,65
(5) Число КС на газопроводе	10	15	20	30	45	60	90	120	150	300
(6) Рабочая мощность КС, кВт	28 800	35 030	40 010	48 000	27 470	19 560	12 740	9 670	7 780	4 490
(7) Мощность на 100 км газопровода, кВт	9 630	17 520	26 670	48 000	41 210	39 130	38 220	38 690	38 920	44 910
(8) Удельная мощность КС, кВт/100 км	0,544	0,825	1,112	1,708	1,438	1,358	1,322	1,341	1,350	1,548
(9) Удельная мощность КС, %	31,8	48,3	65,1	100,0	84,2	79,5	77,4	78,5	79,0	92,7

Key:

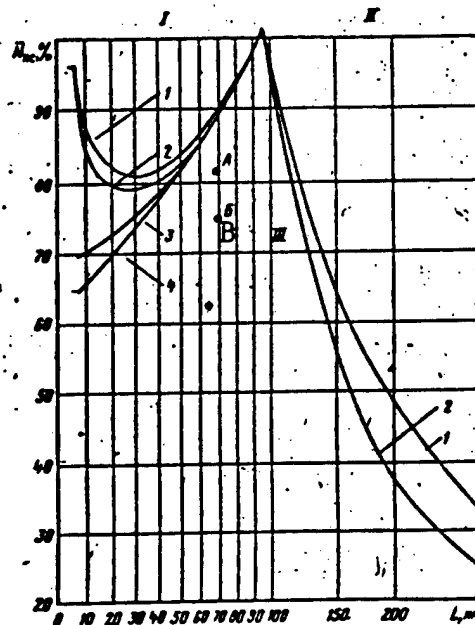
1. Gas pipeline productivity, billion m³ annually
2. Gross
3. Commercial
4. Gas consumption for KS operational needs, billion m³ annually
5. Number of KS on line
6. Working power, kW
7. Power per 100 km, kW
8. The unit power of KS $\frac{\text{kW}}{100 \text{ km}}$
1 million m³ commercial gas
9. The unit power of KS, percent

A study of Tables 2 and 3 shows that if the spacing between KS is reduced by one-third, the working power of the KS declines by 14.2 percent. The minimal required power can be attained by reducing the spacing 3 fold (by 20.4 percent). Further reductions in spacing lead to increases in KS working power. A 10 fold reduction in spacing only reduces power by 6.5 percent compared to the standard variant.

Even for a limiting, hypothetical variant, where losses at the KS inlet and outlet are assumed to be zero, if the spacing is reduced by one-third, working power is reduced by 14.8 percent; while if spacing is reduced 3 fold, the decline is 25.1 percent. Further spacing reductions lead to asymptotic declines in power; with a 10 fold decline in spacing, required power drops by 31.6 percent.

The consumption of gas for KS operational needs declines by the same percentage. As a result, the relationship of unit power to commercial gas declines somewhat more than KS working power: 15.8 percent instead of 14.2 percent with a one-third reduction in spacing, and 22.6 percent instead of 20.4 percent with a 3 fold reduction in spacing.

The diagram presents the dependence of KS relative power on spacing distance. Curve 4 here is drawn from data in reference [2]. Points A and B correspond to data in reference [3] for a spacing distance of 72.7 percent of standard (80 instead of 110 km).



Dependence of KS Relative Power Upon Spacing Between KS

I, II, III. -- low pressure, increased spacing, and traditional variant for gas pumping; 1. KS working power per 100 km of line; 2. KS unit power per 1,000 m³ of commercial gas; 3. Working power, with no losses at KS; 4. Working power, using data from [2]; A, B. Fuel gas consumption and KS installed capacity, following data in [3].

A comparison of curve 4 with curve 1, drawn on the basis of our calculations, shows their different character. Instead of the minimum and curvature for spacing equal to one-third of the standard, characteristic of curve 1, curve 4 shows a reduction in relative power following a decline in spacing to 1/10. Curve 3 approximates curve 4 only for a hypothetical KS without pressure loss at inlet and outlet.

Data in [3] significantly exaggerate the reduction in required power with a 27.3 percent reduction in spacing (26.4 instead of 11.2 percent for GPA installed power, or 20 percent instead of 11.2 percent for fuel gas consumption).

An increase in spacing between KS, retaining the compression ratio assumed here leads to reductions in the capacity of each line (See Table 3). However, the power needed to compress gas declines significantly more than line capacity. In particular, if the KS spacing is cut in half, KS power (per 100 km of line) declines by 63.5 percent, while unit power (per 1,000 m³ of commercial gas) declines by 51.3 percent. Fuel gas consumption for KS operational needs declines in the same proportion.

The above gas transport technology ensures a reduction in unit energy outlays.

The variants with increased spacing use traditional parameters for KS (power and compression ratio). Because of the greater spacing between KS, there is a decline in total working power, average gas velocity and correspondingly in gas line capacity, with a substantial decline in unit power for gas pumping.

Low pressure variants provide for the dispersal of working power along the line (with corresponding reductions in compression ratio and spacing between KS). This leads to somewhat of an increase in average pressure, and a decline in average gas flow velocity and unit power for pumping it.

Research on the optimal parameters of future gas pipelines can proceed step by step and in an iterative manner: the initial selection of line diameter and working pressure, the optimal average gas flow velocity and the corresponding installed power is followed by selection of compression ratio, KS power and spacing.

Design for the next five-year plan, where the basic characteristics of lines and pumping units are known, can be limited to the direct optimization of gas line capacity or KS spacing with a given GPA power and centrifugal pump compression ratio.

The economic substantiation of various energy saving technologies requires the calculation of capital investments and operating costs, a considerable share of which are for fuel gas.

The data presented in this article can be the basis for these calculations.

FOOTNOTES

1. I. Ya. Furman and M. B. Chernobyl'skiy, "Criteria for the Selection of the Optimal Spacing Between KS," GAZOVAYA PROMYSHLENNOST', No 11, 1980, pp 15-17.
2. M. I. Brekhman, "Ways of Building an Economical System for Pumping Gas," GAZOVAYA PROMYSHLENNOST', No 3, 1983, pp 2-4.
3. V. V. Grachev and B. I. Ksenz, "The Gas Transport System: Alternative Parameters," GAZOVAYA PROMYSHLENNOST', No 5, 1981, pp 13-15.

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COMPRESSOR STATIONS

GAS PIPELINE PROGRESS IN FEBRUARY

Moscow EKONOMICHESKAYA GAZETA in Russian No 11, Mar 84 p 2

[Article by A. Panin: "Along the Gas Line Route in February"]

[Text] Figures for 1 March show that of the 3,020 km on the Urengoy - Center-I line, more than 2,700 km have been welded, cleared and laid in the trench, about 700 km of this was in January and February. This creates the prerequisites for line work to be completed far ahead of schedule.

More than 400 km were tested in February. A number of spreads, having completed installation of their sections, have been transferred to the construction of the next line, the Urengoy - Center-II.

An especially difficult task is now facing units of USSR Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises], USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises], USSR Minenergo [Ministry of Power Engineering], USSR Minpromstroy [Ministry of Industrial Construction], USSR Ministroy [Ministry of Construction] and USSR Mingazprom [Ministry of the Gas Industry]. During the first half of the year they must complete the construction and put into operation 22 compressor stations on the Urengoy - Pomary - Uzhgorod main pipeline. In 1983 they put 19 stations into operation instead of the 17 called for by the plan. The precise, smooth operation of all general contractor, installation and set-up organizations, builders and the client is essential for bringing the pipeline up to planned capacity.

Many construction and installation organization collectives have assumed increased socialist obligations to beat the schedule and put the compressor stations on the Urengoy - Pomary - Uzhgorod line into operation in the First Quarter of the current year. Over a two month period there has been a considerable increase in Minneftegazstroy's work pace. Work is successfully under way on the Gornozavodskaya, Pelymskaya, Sosnovskaya, Khasyreyskaya, Sechenovskaya, Romenskaya and Golyatinskaya compressor stations.

The best results in the socialist competition have been achieved by the Komsomol-youth brigades from No. 3 and No. 39 construction administrations, headed by N. Drova (Severgazstroy Trust) and L. Lasiye (Nadymgazpromstroy Trust).

Comprehensive construction of housing and social-cultural facilities for operators is under way simultaneously with the erection of the compressor stations.

Unfortunately, the work pace at some stations is still insufficient. It is above all essential that organizations in Glavtyumenneftegazstroy, Glavurengoygazstroy and Glavsibtruboprovodstroy significantly speed up work on the Tayezhnaya, Yagel'naya and Bobrovskaya stations in Tyumen Oblast and that Soyuzintergazstroy do the same at the Ordinskaya station in Perm Oblast. Greater speed and flexibility in the solution of many problems, including the outfitting of stations and in start-up and trouble shooting work is required from Mingazprom managers.

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COMPRESSOR STATIONS

GAS PIPELINE PROGRESS IN APRIL

Moscow EKONOMICHESKAYA GAZETA in Russian No 19, May 84 p 2

[Article by A. Panin: "Along the Gas Line Route in April"]

[Text] In accordance with socialist obligations, in April more than 3,000 km of the line laying work on the Urengoy -- Center-1 Gas Pipeline were completed ahead of schedule..

The line is now undergoing prestart-up testing and some sections are being put into operation.

The ahead of schedule introduction of another, the fifth of six, large lines from West Siberia to the European part of the country which are now under construction means millions of cubic meters of above-plan fuel and valuable feedstocks for industry. It is a weighty contribution to the implementation of the USSR Energy Plan. This is why builders are diligently struggling literally around the clock to start up the lines ahead of schedule. Collectives of spreads, working under the slogan "A kilometer of completed pipeline every working day" have made a substantial contribution to fulfilling socialist obligations.

Among those distinguished by especially smooth operations and good work and political attitudes are the spreads led by S. Matsko (Vostoktruboprovodstroy Trust, Glavvostoktruboprovodstroy) and I. Kirichenko, Kuybyshevtruboprovodstroy, Glavtruboprovodstroy. They were ahead of schedule in completing the sections of the Urengoy - Center-1 line entrusted to them.

The pace is picking up on the construction of the Urengoy - Center-2 line, the sixth and last line for this five-year plan. As of 30 April, 2,800 km of pipe had been delivered, more than 850 km welded and about 600 km laid in the trench.

The following trust and spread collectives distinguished themselves here: those led by F. Sosin, N. Borisenko and A. Buyankin in Novosibirsktruboprovodstroy, Severotruboprovodstroy and Mosgaztruboprovodstroy. However, in order to fulfill the obligations assumed -- handing over 1,500 km of this line by the end of the first half of the year -- it is essential to immediately dispatch collectives released from the Urengoy - Center-1 line to this project.

Compressor station installation work is continuing on the Urengoy - Pomary - Uzhgorod and Urengoy - Center-1 lines. Collectives from the Kazymgazpromstroy, Uralneftegazstroy and Bashneftepromstroy trusts are diligently working during these days preceding May Day. During the remaining months of the first half of the year, builders in the Ministry of Construction of Petroleum and Gas Industry Enterprises must put into operation 10 compressor stations on the Urengoy - Pomary - Uzhgorod line and 6 on the Urengoy - Center-1 line.

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COMPRESSOR STATIONS

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ACCELERATION OF COMPRESSOR STATION CONSTRUCTION URGED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 5, May 84 pp 6-7

[Article by B. A. Furman: "Don't Rest on Achievements"]

[Excerpts] Main pipeline builders in 1984 are trying not to lose the pace attained in the construction of the Urengoy - Pomary - Uzhgorod export gas pipeline.

Units of Glavtruboprovodstroy [Pipeline Construction Main Administration [MA]], Glavvostoktruboprovodstroy [Pipeline Construction in the Eastern Regions MA] and Glavsibtruboprovodstroy [Construction of Pipelines in Siberia MA] have obligated themselves to beat the deadline for the completion of pipe laying work on their sections of the Urengoy - Center I line. A welders brigade at the Tatnefteprovodstroy [Tatar Oil Pipeline Construction] Trust, led by N. I. Nikolayev, winner of a USSR State Prize, has resolved to do a high quality welding-installation job on the Kholmogory - Klin Oil Pipeline. The installation workers brigade at the Tyumenneftegazmontazh [Construction of Petroleum and Gas Industry Enterprises in Tyumen Oblast] Trust, led by V. G. Brizkun, winner of a USSR State Prize, has called upon builders of above ground facilities to achieve the highest labor productivity in 1984. This collective has assumed the obligation of introducing capacity for 129,000 cubic meters of oil in the fourth year of the Five-Year Plan. The collective at the Orgtekhtruboprovodstroy [Organizational and Technical Pipeline Construction] Trust has performed the valuable feat, obligating itself to speed up, by two months, the introduction of work plans utilizing experience from the construction of the Sosnovskaya and Bobrovskaya compressor stations.

The reduction of compressor station (KS) installation time is one of the important production tasks in 1984. Keep in mind that just on the most important projects -- the Urengoy - Pomary - Uzhgorod and Urengoy - Center I lines we are faced with building 35 compressor stations, 16 of which will this year help bring the export line up to planned capacity. The 19 start-up compressor stations on the Urengoy - Center I will be a reliable reserve for supplying raw material and fuel to industrial regions in the country.

The time required for KS construction must be made to correspond to the high speed rates of pipe laying work.

S. M. Shmyrev's comprehensive brigade is a leading unit in SMU-38 Trust No. 4. Using the temporary duty method, this collective has spent about 150,000 rubles on KS installation, almost 1.5 fold the plan target. Turbine unit foundations and concrete floors have been poured. It took 30 days to pour the first, 20 for the second and only 15 for the third. The speed-up was due to improvements in reinforcement work. During the construction of the first and second foundations only part of the reinforcement mesh and bar was tied, the rest was welded, while practically all of the third was tied.

Two links worked on the foundation for the third unit. The first link, consisting of three people, did the earth work, concrete pad, and prepared formwork and reinforcement frameworks. The second link tied the rebar. All operations were completed in 14 days. Then 200 cubic meters of concrete were poured in 9 hours using 4 dump trucks and 3 concrete mixers.

S. A. Arbuzov's collective in the SU-7 Tsentrokomplektmontazh [Central Outfitting and Installation] Trust specializes in the installation of KS turbine units. Practically all stations south of Ural on lines from Urengoy to the center of the country are equipped with machines assembled and installed by this brigade. After more than two decades of working with the trust, S. A. Arbuzov has become an acknowledged master, authority and specialist. His work was awarded the "Znak Pocheta" Order. The eight riggers under his leadership have completed work equal to a section.

The outfitting of processing equipment, performed by units from the Ministry of the Gas Industry, is one of the tightest bottlenecks in compressor station construction. The lack of reliable outfitting leads to frequent idle time for builders and forces trust and administration managers to deviate from rational work organization and use brigades for tasks not appropriate to their skills.

Experience in the construction of previous compressor stations has shown that the smooth delivery of equipment and the guarantee of a stable work front stimulate builders to be on or ahead of time in putting projects on line.

Speeding up the work pace and exercising constant control over quality have now become the main tasks, making it possible to handle high socialist obligations and introduce the most important projects on time.

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COMPRESSOR STATIONS

UKRAINIAN TRADE UNIONS HONOR WORKERS FROM OTHER SOCIALIST COUNTRIES

Kiev PRAVDA UKRAINY in Russian 15 Apr 84 p 3

[Article by RATAU [Ukrainian News Agency]: "The Laws of Brotherhood"]

[Text] Representatives from the fraternal socialist countries are successfully working together with Soviet builders on a number of major projects under construction in the republic. International socialist competition helps these labor collectives be successful. The new form of competition assured a notable victory to the many thousand member international collective. In spite of attempts by the U.S. Administration to disrupt this project of the century, this collective built the unique Urengoy - Pomary - Uzhgorod gas transport system three times faster than the required time. This was discussed on 14 April at Ukrsovprof [Ukrainian Trade Union Council] at a meeting with builders from the GDR, Poland, the USSR and Czechoslovakia who are building the integrating projects, and with citizens from Romania, working at industrial enterprises in the republic.

V.A. Sologub, member of the Ukrainian CP Politburo and chairman of Ukrsovprof, spoke at the meeting. He noted that workers in the Ukraine, just like the entire Soviet people, have been filled with creative enthusiasm by the decisions of the April Plenum of the CPSU Central Committee and session of the USSR Supreme Soviet and the speeches given there by comrade K. U. Chernenko, General Secretary of the CPSU Central Committee and Chairman of the USSR Supreme Soviet. They are exerting every effort to successfully implement the targets of the 11th Five-Year Plan. Participation of many specialists from the countries of the socialist commonwealth in the solution of key national economic problems has become a genuine manifestation of socialist internationalism.

Among the most important integrating projects are the Khmel'nitskaya Nuclear Power Plant and the Bar Compressor Station in Vinnitsa Oblast, a very large trans-continental pipeline repair base in Transcarpathian Oblast and other industrial and social-cultural projects. The experience of these and other collectives in the vanguard of competition is highly valued by party organs and trade unions in our fraternal countries and is being more widely spread to other countries. The Ukrsovprof chairman stressed that the mutually beneficial competition has become multifaceted and stable and serves to strengthen world friendship and peace.

V. A. Sologub gave Ukrsovprof and republic trade union committee honor diplomas and pendants to representatives from collectives winning last year's competition and wished them big new successes in their work.

The following spoke for those awarded: E. Kleichman, chairman of the Main Directorate of the GDR for the construction of the Bar Compressor Station, E. Denchak, section chief of the Czechoslovakian Directorate for the construction of the central repair base in Uzhgorod, Ch. Aleksandrovich, rigger brigade leader at the Main Polish Directorate for the construction of the Romenskaya Compressor Station, Nguyen Van Dikh, leader of a group of Vietnamese workers at the Donetsk Textile Combine and A. A. Zagorodniy brigade leader of the PMK No. 255 Comprehensive Brigade at the Vinnitsapromstroy [Vinnitsa Industrial Construction] Combine. They noted that international competition among the fraternal projects is a genuine school for exchanging progressive experience and has become common to all. Glorious traditions for the creators of socialism and communism are continuing and multiplying at these projects.

The meeting was attended by responsible workers from the Ukrainian CP Central Committee, Ukrsovprof secretaries, representatives from a number of republic ministries and departments and by the general consuls of the GDR, Poland and Czechoslovakia in Kiev, Z. Heldte, V. Kruk and Yu. Vargolik.

Representatives of international collectives laid flowers at the Lenin Monument and visited the exhibit at the Kiev Branch of the V. I. Lenin Central Museum.

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COMPRESSOR STATIONS

BRIEFS

NEW COMPRESSOR UNIT-- Gorkiy Oblast - The first turbine unit for the Pochinkovskaya Compressor Station on the Urengoy - Pomary - Uzhgorod Pipeline has passed the design stage. The 25 megawatt turbine was built by the collective of the Nevskiy Zavod, a Leningrad association. Trouble shooters from the enterprise have now been replaced at the control panel by station staff operators. [Text] [Moscow PRAVDA in Russian 19 Feb 82 p 2] 11574

GAS FIELD REPAIRED -- Gazli (Bukhara Oblast 23 Mar) - Today the delivery of the blue fuel from the Gazli field was restored. This field went out of operation after a recent destructive earthquake. New compressor stations supply gas to the Bukhara - Ural, Bukhara - Tashkent - Frunze - Alma-Ata main pipelines, and to the Fergana Vally and Osha Oblast. During the time the repair workers selflessly worked to restore equipment, the vast region did not experience a shortage of fuel, chemical feedstocks, energy or heat. Supplemental gas was supplied from Central Asia and other union republics. [Text] [Moscow PRAVDA in Russian 24 Mar 84 p 1] 11574

CHUVASH COMPRESSOR STATION -- Planned capacity has been reached by the first section of the Zavolshzkaya Compressor Station on the Chuvash section of the Urengoy - Pomary - Uzhgorod Main Pipeline. Work is simultaneously under way on a compressor station on the parallel Urengoy - Center-1 Line. Its introduction is planned for the year's end. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 30 Apr 84 p 3] 11574

SERIES PRODUCED COMPRESSORS -- Sumy - 5 Apr. The capacity of main gas pipelines will increase through the use of series produced compressors. The production of such units has begun at the Sumy Machine Building Association imeni M. V. Frunze. The units, the first of which is being sent to the country's fuel arteries today, will be manufactured in block models fully equipped at the manufacturing plant. Their capacity has been increased from 10,000 to 16,000 kW. In 24 hours these compressors can pump millions of cubic meters of gas at a pressure of 100 atmospheres. Progressive design decisions have made it possible to reduce the weight of each unit by 10 tons. By the year's end, the Sumy machine builders will send a group of the new units to main gas pipelines. [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 6 Apr 84 p 1] 11574

COMPRESSOR CONTROLS -- Lvov - The reliable operation of gas pipeline compressor stations will be assisted by units which have entered series production at the L'vovpribor plant. Using automatic devices it controls gas pumping units and monitors gas temperature and pressure. The first set has been sent to the Urengoy - Center-1 line. [Text] [Baku VYSHKA in Russian 1 Jun 84 p 1] 11574

URALS PLANT TURBINES -- Pelym (Sverdlovsk Oblast) - The installation of gas pumping units has begun at the Pelymskaya station. They were built by the collective at the Turbomotornyy Zavod Production Association in Sverdlovsk. This is the second station on the Urengoy - Uzhgorod line where Urals turbines have been installed. The Sverdlovsk machines have also been successfully tested at the Krasnoturinskaya GKS [Gas Compressor Station]. Builders, installers and operators have highly praised the units. They are easier to install and are delivered to sites in large modules. Plant engineers are managing work at the sites. [By V. Pankratov] [Text] [Moscow STROITEL'NAYA GAZETA in Russian 11 May 84 p 2] 11574

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ENERGY CONSERVATION

GAS INDUSTRY CONSERVATION EFFORTS REVIEWED

Program in Action

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 4, Apr 84, pp 1-4

[Unsigned Editorial: "The Program of Thrift in Operation"]

[Text] The gas industry is implementing a broad program for the conservation and rational use of material and fuel and energy resources. Guided by decisions of the 26th CPSU Congress, the November (1982) and June and December (1983) CPSU Central Committee Plena on problems in the conservation and effective use of fuel, electrical and thermal energy, the accelerated introduction of energy saving equipment, progressive technology and experience in producing goods with smaller outlays of energy, raw and other materials, the sector's associations and enterprises are successfully meeting the set targets and the socialist obligations assumed by labor collectives.

During 1983 the sector saved boiler fuel equal to to 4.9 million tons of standard fuel, exceeding the annual target by 700,000 tons. The sector's production collectives utilized materials more economically than previously: rolled ferrous metal savings were 3.1 percent, pipe -- 2.5 percent, rolled brass 10.6 percent; the targets were 2.4, 2.0, and 1.7 percent respectively. There were substantial savings of motor fuel used for freight transportation, and targets for the conservation of methanol, caustic soda and other reagents were met.

The results obtained were possible through the implementation of a whole series of organizational and technical measures: the implementation of a comprehensive, targeted program for improving the efficiency of gas utilization, reducing its losses and consumption for operational needs, improving the use of VER [Expansion unknown], creating a system of techno-economic norms and standards and the goal directed work of the Sector Commission on the Economization and Rational Use of Material Resources.

During 1983, 15 of its meetings examined problems of assigning production units targets for material resource savings and consumption norms and the fulfillment of indicators for the ministry as a whole and for individual associations.

The reduction in gas consumption for operational needs and in the sector's losses were attained through the introduction of economical processes in gas

extraction, transportation and processing. This includes block GPA [Possibly: Gas processing units], completely assembled full pressure superchargers with increased unit capacity, air coolers, highly productive field units for gas preparation, exhaust gas heat recovery units, and other progressive equipment.

The main savings in material resources is attained through the use of economical shapes of rolled ferrous metals, improvements in machinery weight, production technology and storage operations, the struggle against transportation and storage losses and the implementation of other measures.

The gas industry has many examples of a creative approach to the search for and use of reserves for conserving material and fuel and energy resources.

At Ukgazprom [Ukrainian Gas Production Association] successful use is being made of a method for the technologically rational utilization of excess potential energy from natural gas, which is usually irrecoverably wasted during the preparation process.

It is used, for example, in the system for the automated injection of inhibitors into the gas flow and to drive metering pumps.

If the method is widely introduced, the economic effect from the use of gas pressure energy for pumping liquids at gas extraction enterprises might be millions of rubles.

The dissemination of the experience of Surguttransgaz [Surgut Gas Transport Association] is providing a sizable fuel savings in the gas transport subsector. This association has organized strict control over the use of fuel gas for operational needs at all compressor stations, has established the optimal productivity of gas lines with AVO [Possibly: air coolers]. This had reduced energy consumption and has limited air heating of cyclic air in the GTK-10-4 units. The association also has an effective technology for cleaning axial compressors and has introduced a progressive system for fuel and energy resource norm setting.

The All-Union Review of the efficiency of resource utilization, in which the majority of the sector's associations participate, is an effective factor mobilizing collectives in the struggle for resource saving.

For two years in a row, the Ukgazprom All-Union Industrial Association has won the highest award in this review -- the Red Banner of the AUCCTU the Komsomol Central Committee and USSR Gosplan.

The use of savings records, an effective method of accounting, has become widespread in the sector. There are more than 7,400 of them in the gas industry. Such savings records are kept in 111 shops, 40 services and 408 brigades in the sector. In addition, 6,852 workers keep their own personal accounts.

Gas workers have a growing interest in improving the results of resource savings. In a number of subsectors this is helped by the introduction of brigade contracts. At present this form of labor organization covers up to 60 percent of drilling brigades.

Side by side with the generally successful resource savings work in the gas industry, there are enterprises exceeding the material resource consumption norms. In 1983 a number of gas transport associations had sizable process losses and overconsumption of natural gas for operational needs: Sredaztransgaz [Central Asian Gas Transport Association] -- 744 million m³, Tyumentransgaz -- 410 million m³, Aztransgaz [Azerbaijan Transgaz] -- 262 million m³. Insufficient attention is given to GPA oil savings. There are substantial differences in the relative consumption of oil used for a given type of unit. For example, in Volgogradtransgaz, GTK-10 machines use 0.87 kg per machine hour, while in Tyumentransgaz the figure is 1.31 kg/machine hr. The Votkinsk, Tbilissi and Novogrudok gas apparatus plants are not meeting the targets for rolled metal savings.

In his speech to the expanded meeting of the Mingazprom board and the Central Committee of the Trade Union of Petroleum and Gas Industry Workers, V. A. Dinkov, the minister of the Gas Industry, pointed out serious cases of mismanagement discovered at Kasporneftegazprom [Caspian Sea Oil and Gas Production Association] enterprises.

The decree directed the attention of association managers to the need for an especially responsible attitude towards setting use norms and assigning fuel and material savings targets to production units of shops, services and brigades.

It is stressed that each worker have specific targets, assume socialist obligations, keep personal records of savings and be given incentives for attaining the best results.

At the end of last year Mingazprom approved "Measures for the Savings and Rational Use of Material and Fuel-Energy Resources for 1984". This was preceded by a great deal of work to reveal reserves for reducing outlays for gas extraction, transportation and processing, and for the production of industrial products and mass consumption goods.

The measures defined specific directions of activities for each industrial and production association in the sector.

The document presents organizational-technical measures for saving all types of fuel, raw and other materials used in the gas industry. The total volume of resources conserved in the sector amounts to 4,845,000 tons of standard fuel. This includes 585,000 tons in the extraction of gas and condensate, 685,000 tons in refining and 3,256,000 tons in transport.

It is planned to save up to 128,000 tons of standard fuel in the production of thermal and electrical energy and up to 190,000 tons in machine building, construction and other production operations.

Together with the introduction of new equipment, the basic measures resulting in the greatest fuel economies in gas transport are:

The improvement of operations for cleaning the flow sections of OK GKU [Possibly: Compressor sections of gas turbine units];

Ensuring optimal working conditions for gas pipelines in the ESG USSR [USSR Unified Gas System];

Timely and proper major repairs to the line components of pipelines, replacing pipe and making maximum use of gas when clearing sections for repair.

The most energy conserving operations in gas extraction are:

Reducing gas use for purging of lines and wells through the feeding of inhibitors to the well bottom and the use of non-hydrate systems for well operation;

Blowing sulfurous gas wells clean after inhibition through a metering separator;

Reducing fuel gas consumption through the modernization and operational optimization of boilers and heat consuming equipment, the use of heat recovery heat exchangers at DKS [Possibly: Extraction compressor station], the utilization of spent steam at UKPG [Comprehensive gas preparation installation] heat exchangers, and the utilization of other VER [Possibly: (hot) water and energy resources];

The use of improved equipment for completing and testing wells without releasing gas into the atmosphere.

A savings of 415,000 tons of standard fuel in gas processing could be attained through the optimization of furnace and boiler unit operations, and improvements in the efficiency of the chemical and mechanical cleaning of heat exchanger working surfaces.

Considerable savings of electrical energy in extraction, transport and processing are attained through the installation of processes using computers to optimize the working conditions of energy using and other equipment.

One section in the document is devoted to the effective use of sizable reserves of material resources in the sector: rolled ferrous metals, rolled carbonic pipe, chemical reagents, motor fuel, etc.

Results from the sector's work during the first months of this year show that in general the associations are making a good start in implementing resource saving measures -- differentiated targets for the effective and economical use of fuel, electrical energy and materials have been worked out and assigned to lower units, and control exercised over their fulfillment.

Studies and experience show that as a rule costs for fuel and energy savings measures are considerably lower than extraction costs. Thus, a general reduction in the consumption and loss of natural gas, electricity, heat, materials and reagents per unit of output is a way of improving production efficiency at each enterprise, association and sectorial element.

Accounting and standard setting work play a very important role in resource savings. The sector has set up a system of norms and standards for the most

important material-technical and fuel-energy resources, making possible substantial savings. However, the presently growing demands for intensified conservation and the struggle against losses and mismanagement should be met by higher standards of management and the rational use of resources. With this goal in mind, Mingazprom must develop progressive, scientifically based norms and comprehensive scientific and technical measures for their implementation.

Increased use efficiency and thorough economies in fuel-energy and material--technical resources, based on the utilization of energy saving equipment in the sector and contemporary energy using equipment and the introduction of progressive norm setting are the most important directions for ensuring the country's reliable gas supply and improving the efficiency of the gas industry.

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Survey by Sector Commission

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 4, Apr 84, pp 1-4

[Unsigned Article: "The Sector Commission on the Economization and Rational Use of Material Resources"]

[Text] In order to find out the state of TER [Fuel-energy resource] saving work at compressor stations, the USSR Glavgosgaznadzor [Main State Gas Inspectorate] surveyed 254 compressor stations having 497 shops, electric power stations for operational needs at 97 KS, boiler facilities at 237 KS and other gas using units.

The check showed that in spite of some improvement in gas saving at KS there are still serious shortcomings.

A number of compressor stations lack gas metering instruments, do not have gas consumption recorders at GPA and such meters and instruments do not always meet requirements. Some associations do not assign lower units gas for operational needs and targets for savings. At the time of the check some KS lacked gas use norms and reporting systems for complying with gas use norms and savings targets. There were also cases of some stations violating technological, plan and report discipline.

In view of the especially unsatisfactory situation at these associations: Aztransgaz, Kuban'morneftegazprom [Kuban - Sea Oil and Gas Production Association], Uzbektransgaz, Sevkavgazprom [North Caucasus Gaszprom], Tyumentransgaz and Ukhtatransgaz, the commission decided to make a detailed examination of results from the check, develop and approve specific measures for eliminating these shortcomings and violations for each gas transport association and KS and, for problems requiring ministry decisions, prepare the appropriate orders.

An important measure for the better organization of TER savings work is the introduction of the improved "Instructions on the Norm Setting of the Consumption of Gas, Other Types of Fuel, Electrical and Thermal Energy at Gas Industry Enterprises", developed by the Norming Department, VNIIEgazprom [All-Union Scientific Research Institute for Gas Industry Economics] and VNIlgaz [VNII for Natural Gas].

The sectorial commission examined and approved the "Measures for TER Economies for 1984-1985", and the "Program for the Preparation of a Complex of Scientific-Technical Solutions to Improve the Efficiency of TER Resource Use in the Gas Industry in 1984-1985 and up to 1990".

The main scientific and technical measures are expected to substantially reduce the unit consumption of TER, above all fuel gas and electrical energy in GPA KS energy drives. They include the development and approval of a targeted comprehensive program for organizing the series production of GPA with steam-gas cycles, increasing the efficiency factor; for the series production of regenerative type GPA with new thermodynamic cycles (isothermic compression in air compressor with enlarged high pressure stage, the two stage preheating of the working unit in a GTU with increased working temperature) and increased efficiency factors; the development and approval of programs for the introduction of electric drive GPA having a regulated rotation speed, electricity supply from regional thermal gas turbine electric power stations with a capacity of 1,000 - 1,500 MW, working in a thermodynamic cycle (a station efficiency factor of about 55 percent); the creation and implementation of a targeted comprehensive program for the reconstruction of the ESG; the completion of renovation work on worn out GPA and the modernization and major repair of operating units and series produced units in order to raise the technical condition coefficient up to about 0.95 in the long term; in 1985 approve the targeted comprehensive program for saving gas, other types of fuel, electrical and thermal energy and in the long term improve energy intensive technological processes in the gas industry.

The commission considered it advisable to conduct, at the VDNKh [Exhibit of the Achievements of the National Economy of the USSR] during the Second Quarter of 1984, a meeting of chief engineers from territorial main administrations, associations and organizations in the gas industry to discuss work on the organization of the savings and rational use of material and fuel-energy resources.

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GENERAL

CHIRSKOV APPOINTED MINISTER OF USSR OIL, GAS INDUSTRY

Moscow IZVESTIYA in Russian 23 Feb 84 p 1

[Article: "In the Presidium of the Supreme Soviet USSR]

[Text] The Presidium of the Supreme Soviet USSR has appointed Comrade Vladimir Grigor'yevich Chirskov minister of construction of oil and gas industry enterprises USSR.



Chirskov, Vladimir Grigor'yevich: Comrade V. G. Chirskov, born 1935, Russian, member CPSU, higher education, candidate of technical sciences. Followed the work path from mechanic of a construction department to deputy minister. Since 1983 has worked as first deputy minister of oil and gas industry construction enterprises. Laureat of the USSR State Prize and the Soviet Ministers' Prize USSR.

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GENERAL

INFRASTRUCTURE OF ASTRAKHAN GAS FIELD EXAMINED

Moscow PRAVDA in Russian 4 May 84 p 2

[Article by V. Stepnov, special correspondent to PRAVDA, Astrakhan-Orenburg: "Astrakhan Gas"]

[Text] A line from the decisions of the 26th CPSU Congress: Establish an industrial center for gas and condensate extraction and refining and sulphur production utilizing the Astrakhan Gas-condensate Field." (From the basic directions for the economic and social growth of the USSR from 1981 to 1985 and the period up to 1990.)

Eight years ago geologists discovered a very rich gas field 70 miles from Astrakhan. Contours of a future gas complex have been laid out in the Trans-Volga steppe. Now roads have been built and bridge supports have been raised over rivers and canals. Gas wells are being drilled and basic field facilities are being built at full speed. Construction of a gas refinery has begun.

Putting the complex into service will add gas, sulphur, carbonic acid and condensate, which consists of gasoline-kerosene fractions, to traditional Astrakhan production. Specialists note the significance of sulphur, a central ingredient in mineral fertilizer production. Production will be measured in billions of cubic meters and millions of tons.

The gas refinery is now being built on the steppe, and only by reading the colorful placards affixed around the construction site can one find out that a dining hall will be here, the management building there, and that there will be the water purification plant. Moreover, one can see such a plant today in all its industrial beauty, not in drawings and miniature mock-ups, but full-scale in metal. One need only travel to Orenburg where a similar enterprise has been operating the 10 years. Succinic-yellow compounds leave here every day, and a stream of blue fuel flows through pipelines to the cities. The Astrakhanites now have an excellent opportunity to acquire the experience of operating an enterprise and to think about it during construction and then in operation.

V. Vakulin, general director of the Orenburg Gas Refining Plant Association recounted the difficulties of starting a plant, the many mistakes and hasty decisions. Sooner or later they were discovered and numerous alterations were made. During each phase, the technological processes were completed, equipment checked and maximum results were achieved during the plant's third phase.

Thus, exhaust gas emissions were successfully cleaned up, exactly what Orenburg advises done at the Astrakhan complex. It was found that ASUTP [Automated Control Systems for Industrial Processes] should be introduced straightaway during equipment assembly, or at least in the pre-operation phase.

It is impossible to enumerate all the details of the organizational and technical sequence discovered during the construction and startup process at the Orenburg gas refinery. Nothing learned must be forgotten; the cost is too high. In order to best preserve the accumulated experience, some 500 workers and specialists were sent from Orenburg to Astrakhan.

Like a magnet, the Astrakhan Gas Complex draws people from all parts of the country. Here come the energetic people, who are light on their feet. Many have worked on celebrated construction projects. At the site we were introduced to Assemblers' Brigade leader A. Buyanov. Robustly built, he was cheerful and smiling. He had brought his brigade from Togliatti, where they had built the Volga Motor Vehicle Plant for Nitrogen Fertilizer Transport. Here, they intend to bring this job to a successful conclusion. The bridge builders V. Arkhipov and V. Sentyurin passed through the Baikal-Amur Main Line "school". Siberian tempering helps one overcome difficulties here no less than in the Taiga. In winter there is the frost and the cutting, piercing wind; in summer, the heat.

What attracts people to the site is the hope of establishing themselves seriously and substantially. This implies not only a profession and an apartment, but a kindergarten for the children, a school, a store, a library, a sports hall and much more. These are the good things of life. Insuring the effective operation of the complex in the future will justify people's hopes. It is a complicated task, and the party, the soviet and economic agencies of the Astrakhan Oblast take full responsibility for its resolution.

It is impossible to provide apartments immediately for everyone who comes. Nevertheless, young people are at present organizing dormitories in the workers' shift settlements. Here are one-, two-, and three-story partitioned residence buildings with all the conveniences. Each settlement has its own boiler room, power station, store and dispensary. It is a small, self-contained city on the steppe. The leaves of the young poplars will start to rustle, the lawns will begin turning green and the clean, neat little towns, looking as if they had come off an advertising brochure, will become even prettier. But no matter how attractive the shift settlements are, they are intended for temporary occupancy.

In contrast to construction jobs being started in remote unpopulated regions, the Astrakhan Gas Complex is near the oblast center. Consequently, it has been decided to work out all housing and sociocultural condition projects in Astrakhan itself. It will not be an isolated city. New city blocks are being added to the ancient city; they will supplement and beautify its architectural ambience.

An example already exists. A similar choice was made in Orenburg. There, the new city was built in the vacant areas of the outskirts. Wherever you look, everything is new: the tall apartment houses, the stores, schools, hospitals, studios, the center for young technicians. Old Orenburg with its low buildings has remained practically untouched, and looks like a patch on a new dress. The city has grown, communication lines have been extended and everyday services are concentrated primarily in the new regions, though they also exist in the old section. Were new buildings to be built where the old now stand, the architectural imbalance could be avoided.

In Astrakhan, the lessons of Orenburg have been heeded. Planners inserted developing regions into the boundaries of the old city, which was spread over 11 islands. The gas complex will give new life to the city. Astrakhan will arise, flourish, and will take its place among modern, well-managed cities. The economic policies of the party show themselves here in the development of mineral deposits, plant and factory construction and further improvement of people's lives.

We traveled around the regions where new factories and plants are planned with N. Kryuchkov, director of the Astrakhan' Civil Planning Institute. On Sofiya Perovskaya Street, some equipment had just been brought together. They had delivered an excavator and a bulldozer and had driven up heavy-duty dump-trucks. They began to demolish the delapidated, superannuated huts. Next door, modern apartment buildings were being built. In the distance the outline of the TETs [Heat and Electric Power Station] now being built were visible; it will provide heat for the new microdistricts. I ask N. Kryuchkov where the bakery, music school, covered market and swimming pool will be built. You see, the present population of Astrakhan, numbering around 500,000, has increased by at least 100,000 in recent years. The growth is stable, and will not be manageable with the extant plans for socio-cultural living conditions; expansion is needed. But construction on such projects has not yet begun. At the time, planners calculated everything needed by the city, and in what quantities. The totals of corresponding projects are to be found with local agencies, the Ministry of Gas Industry and Gosplan USSR, and preliminary work has been approved. However, since then, the city development plant has not been authorized, and without it coordinated progress is very difficult. The Orenburg experience shows that legislation is needed which makes the participation of republic and union ministries mandatory in developing the social infrastructure of the city. No matter how serious the intentions of Mingazprom, it will be very difficult for Mingazprom to build everything planned for Astrakhan.

The question of state significance is being resolved, and we must think of the future, and what we shall leave to our descendants. To this, one of the construction supervisors said, "One day the gas will be gone, but the city will remain."

Not long ago a meeting of the leaders of the gas complex construction commission was held. Along with the achievements, serious omissions were noted. Pace of construction and outfitting jobs has slowed. The main reason for this is the shortage of workers. Specialists cannot be hired, as there is no place for them to live. This includes drillers as well as construction workers. But the construction rate will increase: the first phase of the complex must be operational in 1986.

The best way to attract people to the site is to create conditions for productive labor and complete rest. That would seem to be obvious. All the same, plans for housing construction are not being fulfilled. Home-building capabilities available in the city are evidently being protected from the rising demand. The volume of construction and installation work this year has increased by one and a half times compared to last year, but the amount planned compared to that delivered, remains at the former level.

From former construction jobs we know that when the civil engineering develops alongside industrial construction or outstrips it, plans are fulfilled and deadlines precisely met. In other words, concern for people always gives the best economic results.

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BRIEFS

PROSPECTING EQUIPMENT DELIVERIES INCREASE--Kharasavey (Yamalo-Nenetsk Autonomous Okrug)--The First vessel to arrive this year, the "Pioneer Litvy", was unloaded in Kharasavey today. The vessel delivered drilling machinery, pipe, small houses and equipment to the northernmost geological prospectors' settlement. Shore ice served as the wharf for the dry-cargo ship. The diesel vessel approached with the help of icebreakers. Due to the build-up of geological prospecting jobs on the territories of the Yamalo-Nenetsk Autonomous Okrug, delivery of cargo here by the North Sea route this year will be significantly increased. [Text] [Moscow PRAVDA in Russian 13 Apr 84 p 8] 12659

OIL TOWN'S MOBILE POLYCLINIC--Nizhnevartovsk (Tyumen Oblast)--A mobile polyclinic has been established in this young city of oil workers. The drillers, geologists and construction workers of the Samothor oil field became its first patients. The facilities of the unusual polyclinic include a dentist's office, a therapeutic office and the clinical laboratory that have been built into a production-model bus. Similar services are being established in many cities of the petroleum-producing Ob River Region. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 14 May 84 p 1] 12659

PETROLEUM WORKERS' HOUSING--Toilers of the second sector of Azmorneft'stroy SMU-4 [Construction and Installation Administration], in the Lok-Batan settlement are working like shock-workers and implementing the decisions of the December 1983 and February 1984 Plenums of the CPSU Central Committee to increase labor productivity and lower production costs. This outstanding collective, led by the young engineer F. Sadykov, is carrying out, 7,680 square meters ahead of schedule housing construction. And recently, installation of about 15 km of water and gas lines was completed. After these are put into operation, provision of fuel and water to the inhabitants of the workers' settlement will improve. Shock work of the integrated stonemasons brigade, led by R. Allakhverdiyev and V. Babakekhyan, is especially outstanding. To welcome the First of May, the construction workers took high obligations for this year: to put into operation about 9,000 square meters of living space, and they are resolved to do this successfully. [By E. Melikov] [Text] [Baku VYSHKA in Russian 24 Apr 84 p 1] 12659

KHARKOV'S CLEAN AIR EFFORT--The Kharkov TETs No 5, largest in the Khar'kovenerg Association, has converted from liquid fuel to natural gas. This measure has brought about both economic and ecological benefits: the air has become cleaner, and plant life no longer suffers. In Kharkov, a city of 1.5 million residents much is being done to clean up the environment. Only in the last few years 110 coal-powered furnaces been eliminated here, and residences been converted to centralized heating. Within the enterprises about 1,000 facilities have been put into operation to prevent emissions of toxic waste into the atmosphere. A new plant, capable of burning a million cubic meters of trash per year, markedly improves the city's "health". [By A. Vyatkin] [Text] [Moscow SOTLIALISTICHESKAYA INDUSTRIYA in Russian 13 May 84 p 2] 12659

IRKUTSK AREA DEVELOPMENT CONFERENCE--Scientists, directors and specialists of the national economy completed preliminary discussions in preparation for a regional scientific-practical conference. Conference will be devoted to the economic and social development of the Irkutsk oblast during the 12th Five-Year Plan, and up to the year 2000. The special attention of the geologists is centered on the Nepskiy Arched Uplift, where future reserves of oil are predicted. Huge deposits of potassium salts have been discovered right here that should be commercially developed. [Text] [Moscow SOVETSKAYAROSSIYA in Russian 12 May 84 p 2] 12659

NEW GENERATION FURNACES DEVELOPED--(Response To Review entitled: "Development of Thermal Energy" No 46, 1983)--It is correctly noted in the Review that the development, assimilation and widespread adoption of boilers with fluidized-bed combustion chambers in the national economy will help solve the very important problem of using low-grade fuels. To speed up these operations right now, organizations of USSR Minenergomash and USSR Minenergo have established a complex program for the two ministries to upgrade furnaces currently in operation and develop new furnaces with fluidized-bed combustion chambers with outputs of 120-670 tons per hour. Implementation of the program begins in 1984. As far as the GTE-150 gas turbine installation is concerned, it should be noted, that it puts out at an initial gas temperature of 1,100 degrees, and which is still not used by domestic industry. An entire complex of problems has come to light regarding the securing of a stable technology in the manufacturing of cast vanes, and to guarantee their reliable operation. At the present time the Leningrad Metal Plant and the Leningrad Turbine Vane Plant, jointly with NPO TsNIIMASH [Science and Production Association of the Central Science and Research Institute for Machine Building] and NPO TsKTI [Science and Production Association of the Central Scientific Research, Planning and Design Boiler and Turbine Institute imeni I.I. Polzunov] are developing organizational and technical measures for the creation of cast cooled turbine vanes for the GTE-150 [By V. Goloviznin, chief technical administration, member Minenergomash Collegium] [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 3, Jan 84 p 9] 12659

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